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Occupational Health & Safety

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VENTILATION FOR CONTAMINANT CONTROL - An Annotated Bibliography of Selected Literature

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INTRODUCTION

Ventilation is an effective method for reducing worker exposure to airborne contaminants in the work environment.

While there is no substitute for experience in the practice of ventilation for contaminant control, this publication provides a practical guide for gaining knowledge and an appreciation of the difficulties and complexities involved in this challenging area. It highlights some of the current literature available in this field.

This bibliography is intended primarily for those who are engaged in the design, installation and evaluation of industrial ventilation systems. This includes engineers, designers, and other related professionals. It can also be used by employers seeking information on the applications of ventilation for contaminant control.

While the bibliography is by no means exhaustive, the material selected provides a solid foundation on which a "ventilation library" could be built.

Most of these materials are readily available in the Alberta Occupational Health and Safety Library, the University of Alberta Library, and public libraries. Those who wish to purchase the material should contact the relevant publishers directly.

BIBLIOGRAPHY OF SELECTED LITERATURE ON VENTILATION FOR CONTAMINANT CONTROL

1. **Industrial Ventilation - A Manual of Recommended Practice, 18th Edition (1984). Committee on Industrial Ventilation, American Conference of Governmental Industrial Hygienists (ACGIH), P.O. Box 16153, Lansing, Michigan 48901, U.S.A.**

   This manual is widely recognized as one of the authoritative references in the field of design, installation and evaluation of exhaust ventilation systems.

   The text covers a broad range of topics, including fundamental principles of airflow, ventilation system design criteria, ventilation system testing, makeup air, recirculating ventilation system, and air cleaning devices. The exhaust hood design details offer practical solutions to many of the ventilation problems frequently encountered in industry.

   Despite inadequate treatment or explanation in the areas of dilution ventilation, exhaust of thermal contaminants, and dust control, this manual succeeds in illustrating comprehensive procedures for designing exhaust ventilation systems. It is updated every two years, and a "Notice of Intended Changes" is included in the Appendix section.

2. **Industrial Ventilation - A Self Study Companion to the ACGIH Ventilation Manual (1982), D.J. Burton. ECE, Inc., 1264 3700 South, Salt Lake City, Utah 84106, U.S.A.**

   This is a self-study companion to #1. It is intended to provide an introduction to industrial ventilation for the first-time learner or refresher. It is organized and written in a clear, logical manner with easily understood terms, and many working examples.

   This self-study guide is a superb learning instrument for those who wish to explore the field of ventilation for contaminant control.

3. **Recommended Industrial Ventilation Guidelines (1976), National Institute for Occupational Safety and Health (NIOSH). U.S. Government Printing Office, Washington, D.C. 20402, U.S.A.**

   This NIOSH document is an excellent source of information on details of exhaust hood design for some industrial operations. The information contained in this guideline is complementary to that found in #1. Documentation of the rationale which was used to develop guidelines for ventilation of specific operations, is provided.

   Like many published NIOSH documents, this manual has not been updated since its publication in 1976. Nevertheless, this guideline will be a valuable addition to the library of those interested in industrial ventilation.

4. **Handbook of Ventilation for Contaminant Control (1976), H.J. McDermott. Ann Arbor Science Publishers, 230 Collingwood, P.O. Box 1425, Ann Arbor, Michigan 48106, U.S.A.**

This publication is an excellent text for learning about the basics of ventilation for contaminant control. It is written in a simple, straightforward manner. Extensive use of illustrations and examples adds significantly to the reader's understanding of the working principles of industrial ventilation and their applications.

The text provides a succinct review of dilution ventilation, local exhaust ventilation, fundamentals of air flow, hood selection and design, ventilation system design, economics of operating ventilation systems, etc..

This comprehensive textbook has significant value, and should be on the bookshelves of all engineers, hygienists, employers, and other health and safety professionals.

5. **Controlling In-Plant Airborne Contaminants (1983), J.D. Constance. Marcel Decker, Inc., 270 Madison Avenue, New York, New York 10016, U.S.A.**

This reference is based on the practical experience of a consulting engineer. The author's expertise is in engineering design, installation, and operation of in-plant contaminant control systems.

The book provides valuable information on the control of health and explosion hazards in the oil refining and chemical processing industries.

Topics covered include: dilution ventilation for controlling health and explosion hazards, local exhaust ventilation for gaseous and particulate contaminant control, and design for pressurized ventilation. Two useful appendices are included in the text. It is a book that deserves a strong recommendation, especially to those working in the oil refining and chemical processing industries.

6. **ASHRAE Handbook and Related Publications. The American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE), 1791 Tullie Circle, N.E. Atlanta, Georgia 30329, U.S.A.**

The ASHRAE Handbook is an authoritative document and a useful tool for those engaged in the practice of heating, ventilation, refrigeration, and air conditioning. It provides the most comprehensive and current sources of reference data available.

The ASHRAE Handbook is composed of four volumes, each of which is revised alternately once every four years. They are:

(1) 1985 Fundamentals Volume
(2) 1982 Applications Volume
(3) 1983 Equipment Volume
(4) 1984 Systems Volume

The ASHRAE Transactions are compilations of technical papers presented at ASHRAE semi-annual meetings by authorities all over the world.

7. **Design of Industrial Ventilation Systems, 5th Edition (1982) J.L. Alden and J.M. Kane. Industrial Press Inc., 200 Madison Avenue, New York, New York 10157, U.S.A.**

Previous editions of this book have concentrated on the subject of local exhaust ventilation, covering topics such as theory of airflow, system design, and performance testing. Starting from the fourth edition, this book is revised under a co-authorship to reflect the latest technological developments and approaches. Its scope has been expanded to elaborate on hood designs, dust collectors, general exhaust ventilation, and makeup air.

This book provides a practical guide to industrial ventilation and is a good source of technical information.

8. **Patty's Industrial Hygiene and Toxicology (1978), Volume I and III Edited by G.D. Clayton and F.E. Clayton. Wiley-Interscience Publication, A Division of John Wiley and Sons, Inc., 605 Third Avenue, New York, New York 10016, U.S.A.**

This classic document is one of the authoritative references providing invaluable guidance in the occupational health field. Relevant to ventilation control are Chapters 18 and 19 of Volume I, and Chapter 18 of Volume III. Chapter 23 of Volume III provides a cross-sectional review of the potential health hazards associated with some major industrial processes and materials. This chapter is of significant value, as many health hazards must be recognized and evaluated, before ventilation can be employed successfully to control exposures.

This well-organized document contains a broad spectrum of information, and would serve as an indispensable addition to a health and safety library.

9. **Plant and Process Ventilation (1963), W.C.L. Hemeon. Industrial Press, New York, New York, U.S.A.**

Although this book was written in 1955, much of its information is still applicable to today's occupational health problems. There are excellent chapters on dust control, materials-handling systems, exhaust for hot processes, general dilution ventilation, fans, injectors, natural draft ventilators, dust separators and collectors, and control theories.

Despite its lack of current information, this classic book provides a solid background for understanding dust control, thermal contaminant control, and dilution ventilation.

10. **Indoor Air Pollution (1983), R.A. Wadden and Peter A. Scheff. A Wiley-InterScience Publication, John Wiley and Sons, Inc., 605 Third Avenue, New York, New York 10158, U.S.A.**

This is a difficult but rewarding publication to read, and is not suited to those with little or no technical background in indoor air pollution and control. However, this book succeeds in creating a heightened awareness of indoor air pollution or pollutants, and includes techniques for predicting, characterizing and controlling the associated problems.

The pollutant mass balance model presented in the text illustrates ways of predicting indoor contaminant concentration levels, before applying appropriate ventilation. Working examples following ASHRAE Ventilation Design Criteria provide sound approaches to solving indoor air pollution problems in a systematic manner.

11. **Indoor Air - Buildings, Ventilation and Thermal Climate, Volume 5 (1984). Swedish Council for Building Research, Stockholm, Sweden.**

This volume is part of the proceedings of the 3rd International Conference on Indoor Air Quality and Climate held in Stockholm, Sweden, August 20-24, 1984. Papers having similar themes are categorized under subject headings.

These headings are:

(1) Technical Solutions: Providing Adequate Indoor Air Quality and Thermal Climate, Ventilation Efficiency, Air Cleaning Devices, Design Concepts,

(2) Ventilation Criteria: Biological Demands and Formulation of Standards, Specific Environment,

(3) Indoor Thermal Climate: Requirements for Comfort, Health and Performance, Comfort and Performance, Instrumentation, and

(4) Building Performance Assessment: Ventilation, Air Quality.

In general, the technical information contained in this volume represents the state-of-the-art at the time (1984). It would be useful for those concerned with the effect of ventilation upon indoor air quality.

12. **Engineering Field Reference Manual (1982). American Industrial Hygiene Association (AIHA), 475 Wolf Ledges Parkway, Akron, Ohio 44311-1087, U.S.A.**

This is a pocket-size engineering field reference manual, compiled by the AIHA Engineering Committee. It serves as a quick reference and convenient summary of commonly used hygiene information for those who do not have ready access to a reference library.

This manual contains formulas, conversion tables, rules of thumb, and technical information covering a broad cross-section of industrial hygiene.

13. **American Industrial Hygiene Journal. American Industrial Hygiene Association, 475 Wolf Ledges Parkway, Akron, Ohio 44311-1087, U.S.A.**

This monthly journal often offers high quality technical papers on ventilation related topics. All technical papers are subject to peer review, and reflect the most current technological developments and latest research information.

14. **National Institute for Occupational Health and Safety (NIOSH) Publications. U.S. Government Printing Office, Washington, D.C. 20402, U.S.A.**

There is an increasing number of research reports or technical guidelines published on the subject of ventilation under the sponsorship of NIOSH.

A few examples are:

(1) DHEW (NIOSH) Publication No. 78-124
A Recommended Approach to Recirculation of Exhaust Air,

(2) NIOSH 79-143A and B
Validation of a Recommended Approach to Recirculation of Industrial Exhaust Air - Volume I and II,

(3) DHHS (NIOSH) Publication No. 81-113
Evaluation of Air Cleaning and Monitoring Equipment Used in Recirculation Systems, and

(4) DHHS (NIOSH) Publication No. 81-121
An Evaluation of Engineering Control Technology for Spray Painting.

These reports represent an update on research projects and studies of current interest in ventilation. While many of these research reports contain invaluable technical information, others are too theoretical for an ordinary individual without any technical background.

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